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(54) Title: A PROCESS FOR THE MANUFACTURING OF DECORATIVE LAMINATE

(57) Abstract: A process for the manufacturing of a decorative laminate, which laminate comprises an upper decorative and abrasion resistant thermosetting laminate layer and a carrying core. The upper side of the core is provided with the abrasion resistant thermosetting laminate with a dampening foil of an elastomer arranged between the upper side of the core and the abrasion resistant thermosetting laminate, which elastomer and which thermosetting laminate are joined with each other and with the core by means of pressing.

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A PROCESS FOR THE MANUFACTURING OF DECORATIVE LAMINATE

The present invention relates to a process for the manufacturing of a decorative thermosetting laminate with a damping layer intended to decrease the sound-level.

Products coated with thermosetting laminate are common nowadays. They are foremost used where the demands on abrasion resistance are great, but also where resistance towards different chemicals and moisture are demanded. As example of such products can be mentioned floors, floor beadings, work tops, desk tops and wall panels.

The thermosetting laminate most often consists of a number of base sheets with decor sheet arranged closest to the surface. The decor sheet can be provided with a desired decor or pattern. Such laminates are very hard in order to withstand the wear they are exposed to. This will unfortunately lead to a high noise level when hard objects are retarded suddenly by the laminate surface, such as hard heels towards a laminate surface.

It is desirable to be able to muffle the sound level in locales with a floor surface of laminate, specially in locales where shoes normally are used.

It has, through the present invention, been made possible to meet the above mentioned desires and a thermosetting laminate with a lower noise level in respect of for example step noise, has been achieved. Accordingly, the invention relates to a process for the manufacturing of a decorative laminate, which laminate comprises an upper decorative and abrasion resistant thermosetting laminate layer and a carrying core. The invention is characterised in that the upper side of the core is provided with the abrasion resistant thermosetting laminate with a dampening foil of an elastomer arranged between the upper side of the core and the abrasion resistant thermosetting laminate. The elastomer and the thermosetting laminate are joined with each other and with the core by means of pressing.

The thermosetting laminate is preferably constituted by one or more decor papers impregnated with melamine-formaldehyde resin and one or more overlay

sheets impregnated with melamine formaldehyde resin arranged on top of the decor papers. The thermosetting laminate may further possibly constitute one or more conventional resin impregnated underlay papers, arranged under the decor paper or decor papers, which underlay papers preferably contains phenol-formaldehyde resin. The different papers are laminated together under increased pressure and increased temperature. At least one of the sheets impregnated with thermosetting resin, preferably the outermost, is provided with hard particles of for example silicon oxide, aluminium oxide and/or silicon carbide with an average size of 1 - 100 μm , preferably around 5 - 60 μm . The thermosetting laminate suitably has a thickness in the range 0.3 mm - 1.2 mm, preferably 0.3 mm - 0.9 mm and a density in the range 1250 - 1500 kg / m^3 .

The carrying core is suitably constituted by a particle board or a fibre board. It is however possible to manufacture the carrying core from a polymer based sheet comprising organic and/or inorganic particles.

The dampening foil is preferably constituted of a thermoplastic elastomer. The dampening foil suitably has elasticity compression coefficient in the range 0.5 - 2.7 Mpa, preferably 0.8 - 2.0 Mpa as measured according to ISO 3386-1 with supplement from ISO 7214. The dampening foil preferably has a thickness in the range 0.1 - 0.7 mm, preferably 0.1 - 0.5 mm. The dampening foil is suitably constituted of an expanded physically cross-linked polyolefin with closed cells and suitably has a density in the range 150 - 400 kg/m^3 , preferably 180 - 330 kg/m^3 .

The dampening foil and the thermosetting laminate is suitably joined with the carrying core by means of glue and pressure. The glue can hereby be constituted by a water-soluble standard glue or a so-called melt-glue. In the latter case the dampening foil, the carrying core and the thermosetting laminate joined via heat and pressure. It is also possible to let the dampening foil itself work as a melt-glue layer. The dampening foil is then suitably non-expanded and will then have a density in the range 400 - 900 kg/m^3 .

CLAIMS

1. A process for the manufacturing of a decorative laminate, which laminate comprises an upper decorative and abrasion resistant thermosetting laminate layer and a carrying core, characterised in that the upper side of the core is provided with the abrasion resistant thermosetting laminate with a dampening foil of an elastomer arranged between the upper side of the core and the abrasion resistant thermosetting laminate which elastomer and which thermosetting laminate are joined with each other and with the core by means of pressing.
2. A process according to claim 1, characterised in that the thermosetting laminate is constituted by one or more decor papers impregnated with melamine-formaldehyde resin and one or more overlay sheets impregnated with melamine formaldehyde resin arranged on top of the decor papers and possibly one or more conventional resin impregnated underlay papers, arranged under the decor paper or decor papers, which underlay papers preferably contains phenol-formaldehyde resin, which papers are laminated together under increased pressure and increased temperature.
3. A process according to claim 1, characterised in that the carrying core is constituted by a particle board or a fibre board.
4. A process according to claim 1, characterised in that the carrying core is constituted by a polymer based sheet comprising organic and/or inorganic particles.
5. A process according to claim 2, characterised in that at least one of the sheets impregnated with thermosetting resin, preferably the outermost, is provided with hard particles of for example silicon oxide, aluminium oxide and/or silicon carbide with an average size of 1 -100 μm , preferably around 5 - 60 μm .

6. A process according to claim 2 or 5, characterised in that the thermosetting laminate has a thickness in the range 0.3 mm - 1.2 mm, preferably 0.3 mm - 0.9 mm.
7. A process according to claim 2, 5, or 6, characterised in that the thermosetting laminate has a density in the range 1250 - 1500 kg / m³.
8. A process according to claim 1, characterised in that the dampening foil is constituted of a thermoplastic elastomer.
9. A process according to claim 8, characterised in that the dampening foil has elasticity compression coefficient in the range 0.5 - 2.7 Mpa, preferably 0.8 - 2.0 Mpa.
10. A process according to claim 8 or 9, characterised in that the dampening foil has a thickness in the range 0.1 - 0.7 mm, preferably 0.1 - 0.5 mm.
11. A process according to any of the claims 8 - 10, characterised in that the dampening foil has a density in the range 150 - 400 kg/m³, preferably 180 - 330 kg/m³.
12. A process according to any of the claims 1 - 11, characterised in that the dampening foil and the thermosetting laminate is joined with the carrying core by means of glue and pressure.
13. A process according to any of the claims 1 - 11, characterised in that the dampening foil and the thermosetting laminate is joined with the carrying core by means of melt-glue, heat and pressure.

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B32B 27/04, B32B 25/06, B32B 33/00, B44C 5/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B32B, B44C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0590693 A2 (PERSTORP AB), 6 April 1994 (06.04.94), column 3, line 57 - line 58; column 4, line 20 - line 25; column 4, line 1 - line 13, abstract --	1-13
Y	US 5441786 A (MICHAEL MANASSA), 15 August 1995 (15.08.95), column 1, line 5 - line 15; column 1, line 33 - line 35, claims 5-6 --	1-13
A	US 5186996 A (THORSTEN ALTS), 16 February 1993 (16.02.93), claims 7-8, abstract --	1-13

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5842686 A (RICHARD M. HANSEN ET AL), 1 December 1998 (01.12.98), abstract ---	1
A	EP 0329154 A1 (PERSTORP AB), 23 August 1989 (23.08.89), abstract ---	1-13
A	WO 9321402 A1 (ECOMAX ACOUSTICS LTD), 28 October 1993 (28.10.93), abstract ---	1-13
A	GB 1455461 A (WIGGINS TEAPE RESEARCH & DEVELOPMENT LIMITED), 10 November 1976 (10.11.76) ---	1-13
A	DE 2729778 A1 (CONTINENTAL GUMMI-WERKE AG), 18 January 1979 (18.01.79), claim 1 -----	1

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP	0590693	A2	06/04/94	SE	0590693 T3	
				EP	0592013 A,B	13/04/94
				SE	0592013 T3	
				GR	3029639 T	30/06/99
				GR	3030543 T	29/10/99
				AT	108731 T	15/08/94
				AT	175153 T	15/01/99
				AT	178264 T	15/04/99
				BR	8904257 A	10/04/90
				CA	1321133 A	10/08/93
				DE	68916877 D,T	15/12/94
				DE	68928891 D,T	02/06/99
				DE	68928965 D,T	19/08/99
				DK	418189 A	26/02/90
				EP	0355829 A,B	28/02/90
				SE	0355829 T3	
				ES	2059659 T	16/11/94
				ES	2127238 T	16/04/99
				ES	2131088 T	16/07/99
				FI	103393 B	00/00/00
				FI	893983 A	26/02/90
				NO	174336 B,C	10/01/94
				NO	893409 D	00/00/00
				SE	467150 B,C	01/06/92
				SE	8802982 A	26/02/90
				US	5034272 A	23/07/91

US	5441786	A	15/08/95	AU	662451 B	31/08/95
				AU	4884993 A	21/04/94
				CA	2120458 A	01/10/95

US	5186996	A	16/02/93	CH	678306 A	30/08/91
				DE	59005761 D	00/00/00
				EP	0461215 A,B	18/12/91
				SE	0461215 T3	
				ES	2054481 T	01/08/94
				JP	4505297 T	17/09/92
				JP	6043112 B	08/06/94
				WO	9109728 A	11/07/91

US	5842686	A	01/12/98	DE	19645030 A	15/05/97
				FR	2740520 A,B	30/04/97
				GB	2306617 A,B	07/05/97
				GB	9622830 D	00/00/00
				JP	9177878 A	11/07/97

28/01/02

PCT/SE 01/02704

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
EP	0329154	A1	23/08/89	SE	0329154 T3	
				AT	97062 T	15/11/93
				BR	8900695 A	10/10/89
				CA	1317869 A	18/05/93
				DE	68910548 D,T	28/04/94
				DK	73489 A	19/08/89
				DK	167479 B	08/11/93
				ES	2048218 T	16/03/94
				FI	100464 B	00/00/00
				FI	890746 A	19/08/89
				NO	172529 B,C	26/04/93
				NO	890666 A	21/08/89
				SE	460274 B,C	25/09/89
				SE	8800550 A	19/08/89
				US	4940503 A,B	10/07/90

WO	9321402	A1	28/10/93	AU	668350 B	02/05/96
				AU	1758192 A	18/11/93
				DE	69222063 D	00/00/00
				EP	0635086 A,B	25/01/95
				SE	0635086 T3	
				FI	103212 B	00/00/00
				FI	944621 A	04/10/94
				JP	7506158 T	06/07/95
				NO	180649 B,C	10/02/97
				NO	943747 A	06/10/94
				SE	468454 B,C	18/01/93
				SE	9200229 A	18/01/93
				US	5502931 A	02/04/96

GB	1455461	A	10/11/76	NONE		

DE	2729778	A1	18/01/79	NONE		
